

Multi-Configuration Matched Spectral Filter Core, Phase I

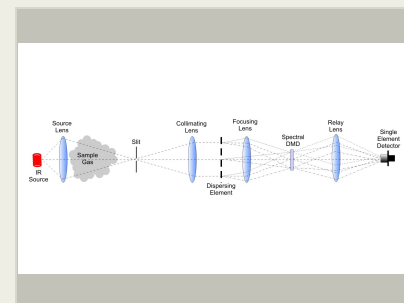
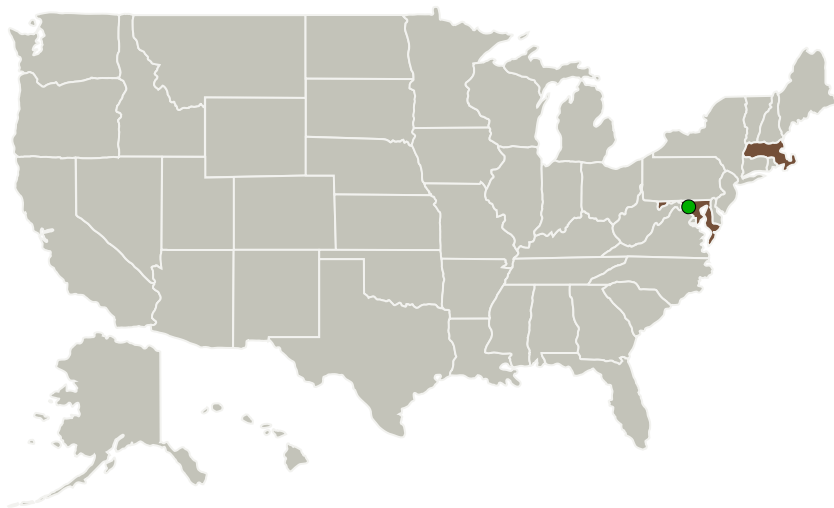
Completed Technology Project (2013 - 2013)



Project Introduction

OPTRA proposes an open-architecture spectral gas sensor based on compressive sensing concepts employed for both spatial and spectral domains. Our matched spectral filter (MSF) core can be used as a single point detector in either point or standoff configurations or it can be coupled with a compressive imaging module for molecular imaging. The MSF core employs a digital micromirror device (DMD) to apply reference spectra to a spatially dispersed spectrum; the dot product measured with a single element photodetector is proportional to the probability of the compound corresponding to the reference spectrum being present. The MSF can also be used for quantification via grayscaling of the DMD. This approach effectively performs multicomponent spectral analysis in hardware rather than software thereby reducing data bandwidth requirements. The MFS will be designed for the 3-5.5 micron spectral range enabling detection and quantification of a range of greenhouse gases and other air pollutants. This solution represents a significant cost and size reduction relative to commercially available spectrometers operating in this spectral range, as it does not require a focal plane array or interferometer. Under the Phase I effort we will design, build, and test the MSF core configured for point detection.

Primary U.S. Work Locations and Key Partners



Multi-Configuration Matched Spectral Filter Core

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Organizations Performing Work	Role	Type	Location
Optra, Inc.	Lead Organization	Industry	Topsfield, Massachusetts
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

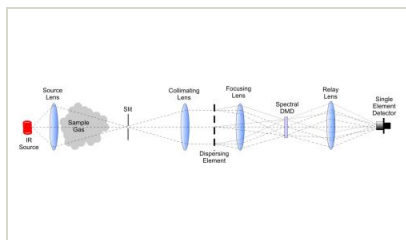
Primary U.S. Work Locations	
Maryland	Massachusetts

Project Transitions

**May 2013:** Project Start**November 2013:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140443>)

Images

**Project Image**

Multi-Configuration Matched Spectral Filter Core
<https://techport.nasa.gov/image/135286>

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Optra, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Julia R Dupuis

Co-Investigator:

Julia R Dupuis

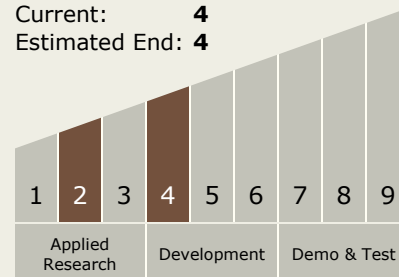
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Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System